

### COURSECONTENT

INDUSTRIAL STRUCTURES								
II Semester: SE								
CourseCode	Category	Hours/ Week			Credits	Maximum Marks		
		L	T	P		C	CIA	SEE
2522051	Core	3	0	0	3	40	60	100
		contactClasses:45		Tutorial Classes:nil		Practical Classes:nil		TotalClasses:45
<b>Prerequisites:</b> Design of Steel Structures & Structural Analysis								

#### Course Overview:

This course introduces planning and design of industrial structures, including components, bracing systems, and steel building design. It covers behavior and design of thin-walled (cold-formed) steel members, addressing buckling and strength aspects. The syllabus includes analysis and design of RC bunkers and silos using theories like Janssen's and Airy's. It also focuses on RC chimneys under wind and temperature effects, and concludes with design principles and applications of cylindrical shell structures.

#### CourseObjectives:

1. To understand the planning, components, bracing, and design principles of steel industrial buildings.
2. To study the behaviour, buckling, and design of thin-walled (cold-formed) steel tension and compression members.
3. To learn the analysis and design of RC bunkers and silos using established theories.
4. To understand stress analysis and design of RC chimneys under wind, temperature, and self-weight effects.
5. To learn the design principles and applications of cylindrical shell structures.

#### CourseOutcomes:AfterCompletion of theCourse,Studentsshouldbeableto

1. Classify various types, components, and bracing arrangements used in steel industrial buildings.
2. Examine the structural behavior and buckling characteristics of thin-walled and cold-formed steel members.
3. Develop design solutions for reinforced concrete bunkers and silos based on theoretical principles.
4. Assess stresses and performance of reinforced concrete chimneys subjected to self-weight, wind, and temperature effects.
5. Construct design procedures for cylindrical shell structures used in industrial applications.



### UNIT -I

Planning of Industrial Structures – types of industrial structures – different components of industrial structures – Bracings of Industrial Buildings – Design of Steel Industrial Buildings.

### UNIT-II

Thin Walled / Cold Formed Steel Members: Definitions – Local Buckling of Thin-Elements-Post Buckling of Thin-Elements – Light Gauge Steel Columns and Compression Members – Form-Factor for Columns and Compression Members – Behaviour of Stiffened Elements Under Uniform Compression – Multiple Stiffened Compression Elements –Effective Length of Light Gauge Steel Compression Members – Light Gauge Steel Tension Members.

### UNIT-III

RC Bunkers & Silos: Introduction – Janssen's Theory – Airy's Theory – Design of Square, Rectangular and Circular Bunkers; Design of Silos.

### UNIT-IV

RC Chimneys: Introduction – Wind Pressure – Stresses in Chimney Shaft Due to Self-Weight and Wind – Stresses in Horizontal Reinforcement Due to Wind Shear – Stresses Due to Temperature Difference – Combined Effect of Self Load, Wind and Temperature – Temperature Stresses in Horizontal Reinforcement Problems.

### UNIT-V

Design Principles of Cylindrical Shells & Design Problems.

### REFERENCEBOOKS:

1. Advanced Reinforced Concrete Design, By N. Krishna Raju (CBS Publishers & Distributors) 2005
2. Design of Steel Structures, By Ram Chandra and VirendraGehlotvol-II, 2007.
3. Design of Steel Structures, By Duggal - Tata McGraw-Hill publishers – 2010.

### ELECTRONICRESOURCES:

<https://nptel.ac.in/courses/105105162>

<https://nptel.ac.in/courses/105106112>

<https://nptel.ac.in/courses/105106113>

<https://nptel.ac.in/courses/105105104>



# **MARRI LAXMAN REDDY**

## **INSTITUTE OF TECHNOLOGY AND MANAGEMENT**

**(AN AUTONOMOUS INSTITUTION)**

(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)

Accredited by NAAC with 'A' Grade & Recognized Under Section 2(f) & 12(B) of the UGC act, 1956

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### **MATERIALSONLINE:**

1. Course template
2. Tutorial question bank
3. Definitions and terminology
4. Assignments
5. Model question paper–I
6. Model question paper–II
7. Lecture notes
8. E-Learning Readiness Videos(ELRV)